

A NEW SPECIES OF *ANOPS* FROM MATO GROSSO, BRAZIL.

(REPTILIA : AMPHISBAENIA)

By A. F. STIMSON

INTRODUCTION

In 1967 the Royal Society and Royal Geographical Society Xavantina-Cachimbo Expedition visited northeastern Mato Grosso State to study natural sciences and medicine. A base camp was set up to the east of the Xavantina-São Felix road at 12°49'S : 51°46'W and between September 1967 and May 1969 a collection of reptiles was made under the supervision of the leader of the expedition, Mr Iain R. Bishop of Leicester University. This collection was subsequently sent to the British Museum (Natural History) where it was found to contain five examples of an undescribed species of *Anops*, a genus hitherto considered monotypic.

Under an agreement between the organizers of the expedition and the Brazilian government the holotype and one paratype have been deposited in the Museu de Zoologia da Universidade de São Paulo (MZUSP). Of the other three paratypes, two have been deposited in the British Museum (Natural History) (BMNH) and one in the University of Michigan Museum of Zoology (UMMZ).

METHODS

Methods and terminology follow Gans & Alexander (1962) and Gans (1966). In describing characters peculiar to *Anops* I have followed Gans & Rhodes (1964). In *Anops kingii* Bell (1833 : 99) the scales between the oculars and the rostral are irregular and variable and Gans & Rhodes (1964 : 15) preferred not to name them individually. In the present species the single scale between the ocular and the rostral is referred to as the prefrontal and the paired scales between the oculars as frontals, terms used for scales occupying similar positions in the related genus *Mesobaena*. Dorsal annuli are counted along the paravertebral row of segments.

Anops bilabialatus sp. nov.

(Text-figs 1-2, pl. 1)

MATERIAL EXAMINED. HOLOTYPE: MZUSP 21276 (lizard collection) an adult female; 12°49'S : 51°46'W, 260 km north of Xavantina, Estado do Mato Grosso, Brazil, 400 m.

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PARATYPES: BMNH 1971.1028 an adult male, UMMZ 131700 an adult female, BMNH 1971.1029 a juvenile and MZUSP 21277 (lizard collection) an incomplete specimen, same locality as holotype.

All material was collected by members of the Xavantina-Cachimbo Expedition between September 1967 and May 1969. They were taken on the surface of the forest floor during rains or in the surface layers of soil pits under forest cover. BMNH 1971.1028 was taken in a soil pit on 3 December 1967.

DIAGNOSIS. A species agreeing with *Anops kingii* Bell (1833 : 99) and differing from all other known New World amphisbaenians in possessing a strongly compressed snout with an enlarged, vertically keeled, keratinized rostral shield. The high number of body annuli (358-372) and the presence of only two supralabials and two infralabials enable this species to be readily distinguished from *A. kingii* (fig. 1). There are 15 to 19 dorsal and 18 to 21 ventral segments in a midbody annulus; two to four lateral and 15 to 16 caudal annuli. The male possesses a pair of well-defined preloacal pores situated anterior to and lateral to the cloaca and separated from each other by four pore-less segments. In the females these pores are much weaker and may not be visible to the naked eye. The tip of the tail forms a blunt vertical ridge with a median dorsoventral suture similar to the 'doubled vertical ridge' (Gans 1971:4) of *Mesobaena huebneri* Mertens (1925 : 170).

DESCRIPTION OF HOLOTYPE. The rostral extends dorsally to the vertical of the posterior border of the first supralabial and is covered by a thick layer of keratin on all but its posterior and oral borders. The nasal is situated in a postero-ventral notch in the rostral and contacts the first and second supralabials and the prefrontal. The second supralabial is in broad contact with the prefrontal and has an oral border equal to that of the first supralabial. The large prefrontal, which is in point contact with its fellow behind the rostral, is the only shield between the ocular and the rostral. The much reduced triangular ocular is in the posterior angle of the prefrontal and second supralabial. It is bordered behind by a dorsoventrally elongated segment of the first body annulus. A single pair of frontals, wider than long, are bordered anteriorly by the prefrontals and posteriorly by the segments of the first body annulus. The mental is longer than wide, as wide as and shorter than the pentagonal postmental which is in broad contact with the second infralabial and narrowly in contact with the first infralabial. There are two infralabials of which the second is approximately five times as large as the first. The single pair of postgenials are a little larger than the malars which just fail to contact the postmental. The postmalar row is continuous with the postoculars and postfrontals (parietals) and with them forms the first body annulus, in which there are a total of 16 segments.

There are 372 body annuli, two laterals and 16 caudal annuli of which the 7th is slightly narrowed laterally and presumed to mark the site of caudal autotomy. There are 18 to 19 dorsal and 19 to 20 ventral segments in a midbody annulus, 28 segments in the autotomy annulus and 31 segments in the first post-autotomy annulus. The lateral groove separating the dorsal from the ventral segments is absent on the anterior 30 annuli and is irregular and indistinct between the 31st

and 52nd annuli. Thereafter there is a well defined straight groove that continues to the last body annulus. It is absent on the lateral and caudal annuli. The ventral sulcus forms a distinct groove anteriorly which peters out at about the 30th annulus and thereafter is indicated only by an alignment of the intersegmental sutures. The dorsal sulcus is indicated anteriorly by the presence of slightly enlarged intersegmental granules and, intermittently, by the non-alignment of the left and right halves of the dorsal half-annuli. On the posterior two-thirds of the body it is indicated only by an alignment of the intersegmental sutures. Precloacal pores are present as small brown dots not visible to the naked eye. There are ten precloacal and 17 postcloacal segments.

In alcohol the holotype is cartridge buff (sensu Ridgway 1912 : pl. 30) with rather indistinct light brown pigment spots confined to the dorsal segments. These spots are absent on the anterior third of the body and thereafter gradually increase in number and intensity posteriorly. At midbody this pigmentation is so weak as to be barely discernible and just before the vent the dorsum is only slightly darker than the unpigmented venter. Heavier pigmentation of the dorsal and dorsolateral caudal segments gives the tail a mottled brown appearance.

VARIATION. Variation in meristic characters is shown in Table 1. All the paratypes differ from the holotype in having the oral border of the second supralabial a little longer than that of the first supralabial. The mental may (BMNH 1971.1028-9) or may not (UMMZ 131700, MZUSP 21277) contact the second infralabial and is a little narrower than (MZUSP 21277) or a little wider than (BMNH 1971.1029) the postmental. The malars are in point contact with the postmental in two paratypes (BMNH 1971.1029 and UMMZ 131700). There are 15 to 17 segments in the first body annulus, 28 to 30 segments in the autotomy annulus and 28 to 31 segments in the first post-autotomy annulus.

The ventral sulcus is present anteriorly on BMNH 1971.1028 and absent on the other three paratypes. The variation of this groove is probably the result of differences in the state of the neck muscles at the time of death and is unlikely to

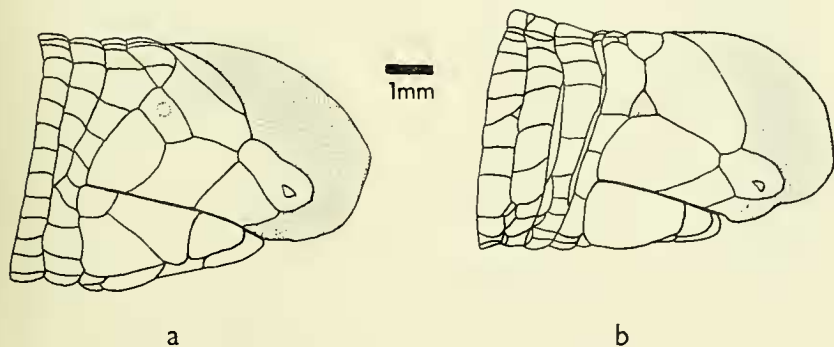


FIG. 1. Lateral view of head. A. *Anops kingii*, BMNH 86.3.10.3 - Rio Grande do Sul.
B. *Anops bilabialatus*, Holotype. Stippling shows keratinization.

be due to real morphological differences. The lateral groove is absent on the first 33 to 39 annuli and becomes well defined between the 43rd and 55th annulus.

The precloacal pores are well developed on BMNH 1971.1028, fainter on UMMZ 131700 and not visible to the naked eye on BMNH 1971.1029. These pores are situated on the terminal segments of the first lateral annulus (fig. 2)

The coloration of the paratypes is basically the same as that of the holotype, BMNH 1971.1028 and MZUSP 21277 being more heavily pigmented and BMNH 1971.1029 and UMMZ 131700 less so.

In alcohol the eye is not visible externally and there is no indication that the ocular scale is more translucent than the adjacent cephalic scales. Dissection of MZUSP 21277 reveals a small pigmented eye with a discernible pupil situated below the posteroventral angle of the ocular.

BODY ANNULI. Gans & Rhodes (1964 : 16) discussed irregularities in the arrangement of body annuli of *A. kingii* and remarked upon the lack of intercalated dorsal half-annuli. *A. bilabialatus* has up to six supernumerary dorsal half-annuli and exhibits numerous other annular irregularities, most of which occur in the anterior third of the body. These take the form of intercalated half-, quarter- and part-annuli and the fusion of one or more segments with those of an adjacent annulus. Shifts in alignment of halves and sometimes quarters of annuli are common and often result in combining two or more annuli into a single spiral. A good example of this occurs in the holotype where nine annuli (49th to 57th) form a continuous spiral. Supernumerary dorsal half-annuli are calculated by simply deducting the ventral count from the dorsal count. In view of the intermittent vertebral non-alignment of annuli and other irregularities it was felt that a better picture of the extent of

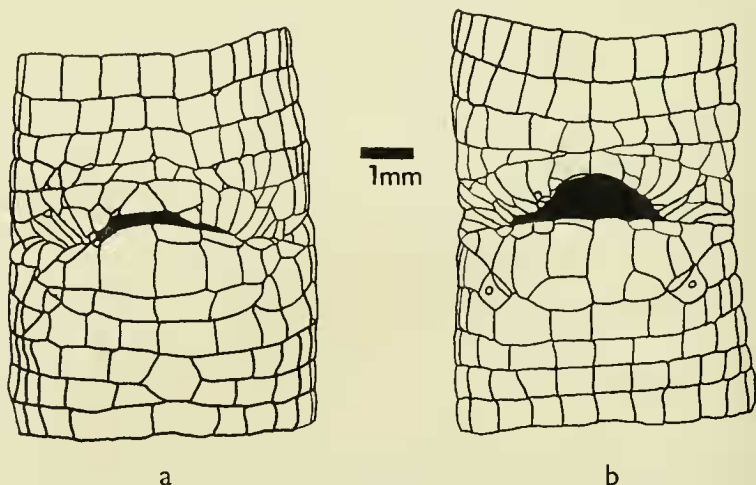


FIG. 2. Ventral view of cloaca of *Anops bilabialatus*. A. Holotype. B. BMNH 1971.1028.

TABLE 1

Data for *Anops bilabialatus*

Collection and number	Sex	Annuli:		Midbody segments Dorsal/ventral	Pre- cloacals	Post- cloacals	Length in mm Snout-vent + tail
		Body + lateral + (autotomy) caudal	Body + lateral + (autotomy) caudal				
MZUSP 21276 (Holotype)	♀	372 + 2 + (7) 16	372 + 2 + (7) 16	17-19/19-21	10	17	250 + 15
BMNH 1971.1028 (Paratype)	♂	360 + 4 + (7) 16	360 + 4 + (7) 16	18-19/19-20	10	16	230 + 15
UMMZ 131700 (Paratype)	♀	358 + 4 + (7) 15	358 + 4 + (7) 15	15-17/18-19	10	17	224 + 14
MZUSP 21277 (Paratype)	?	298 + +	298 + +	16-17/18-20	—	—	—
BMNH 1971.1029 (Paratype)	♀?	366 + 3 + (6) 16	366 + 3 + (6) 16	16-18/18-19	9	17	131 + 10

TABLE 2

Body annuli counts of *Anops bilabialatus*

Collection and number	Ventral		Dorsal		Supernumerary quarter-annuli			
	Left	Right	Left	Right	Dorsal Left	Dorsal Right	Ventral Left	Ventral Right
MZUSP 21276	372	377	378	383	6	6	5	5
BMNH 1971.1028	360	366	365	370	5	4	6	5
UMMZ 131700	358	357	361	363	3	6	-1	2
MZUSP 21277	298 +	300 +	298 +	304 +	0	4	2	6
BMNH 1971.1029	366	368	371	373	5	5	2	2

dorsal supernumeraries would be obtained by making ventral and dorsal annuli counts on the right as well as left side of the body. These produced some remarkable results (Table 2). Not only do there appear to be more dorsal than ventral half-annuli but also more right than left half annuli. Similar variation in supernumerary dorsal half-annuli has been reported for members of the genus *Amphisbaena* (Gans & Alexander 1962 : 102) although its adaptive significance has not been discussed. That the left and right annular counts should differ in a species possessing so many irregularities is not surprising, but that there should be such a marked tendency for the supernumeraries to be on one side rather than the other is not easy to explain. Until further material is collected it seems best to assume that this apparent bilateral asymmetry reflects nothing more significant than uneven sampling.

SKELETAL ELEMENTS. X-rays were taken of all five specimens and, for comparison, of five examples of *Anops kingii*.

The skull is a little more elongate than that of *A. kingii* and extends to about the eighth body annulus. The holotype has 171 body, three lateral and 14 clearly defined caudal vertebrae. In BMNH 1971.1028 and 1029 these counts are 169, three, 14 and 174, three, 15 respectively. A terminal process, presumably the result of fusion and expansion of the last two or three caudal vertebrae, is present on each of the four complete specimens. The pectoral girdle, said by Zangerl (1945 : 778) to be minute in *A. kingii*, does not appear on my X-rays of either species. Perhaps it is too small and/or lies too close to the vertebral column to be discerned. The pelvic girdle consists of a pair of bent rod-like bones not significantly different from those of *A. kingii*.

Alexander & Gans (1966) reported the typical dermal-vertebral ratio of 2 : 1 for *A. kingii*. In *A. bilabialatus* this ratio varies from 2.10 : 1 to 2.17 : 1 suggesting that in addition to the dorsal and right supernumerary quarter-annuli there are between 18 and 30 intercalated annuli even in the left ventral quarter. Intercalated dermal annuli, although atypical, have been recorded in amphisbaenians, notably in species of the sympatric but not closely related genus *Leposternon*.

The most remarkable skeletal difference between *A. bilabialatus* and *A. kingii* is the presence in the former of a fusion and expansion of the terminal caudal vertebrae. Similar modifications are known to occur in several species of fossorial and sub-fossorial snakes and some amphisbaenians. Its occurrence in *Amphisbaena alba* (Linnaeus) has been noted and figured by Gase (1967 : 85). Zangerl (1945 : 778) in his discussion on the post-cranial skeleton of *A. kingii* states that there are '5 clearly defined caudal vertebrae' and 'an undeterminable number of fused ones at the tip of the tail'. Presumably he had a specimen with an autotomized tail. My own observations show the two terminal vertebrae of *A. kingii* to be fused but well defined and not in any way expanded.

SYSTEMATIC POSITION. The present species is the third amphisbaenian with a vertically keeled rostral process to be recorded from South America. Of the three, *Anops kingii* and *A. bilabialatus* agree in having an exceedingly sharp, rounded keel whilst the other species, *Mesobaena huebneri* has a much blunter and more pointed keel. Outside South America only the African genera *Baikia* and *Ancylocranium*

have sharply and vertically keeled snouts but major cranial differences suggest that these are not closely related to the South American forms (Parker 1942 : 57 and Gans & Kochva 1965 : 88).

A. bilabialatus, although clearly related to *A. kingii*, is in some respects intermediate between that species and *Mesobaena*. This is not altogether unexpected since its geographical position is also intermediate, *Mesobaena* occurring in Amazonian Colombia and Venezuela and *A. kingii* inhabiting extreme southern Brazil, Uruguay and northern Argentina. Apart from the differences in the nature of the rostral process the diagnosis of *Anops* has to be changed to separate it from *Mesobaena* when *A. bilabialatus* is taken into consideration (Table 3, nos 2-5). Several characters are diagnostic at the species level but I can find no obvious character, apart from the nature of the rostral shield, that will readily separate both species of *Anops* from *Mesobaena*. However the marked difference in the nature of the rostral keel suggests that *Mesobaena* should continue to be recognized as a separate genus.

A key to the two genera will now have to employ a combination of characters and I suggest the following:

Rostral longer than high with a blunt vertical keel; two preloacal pores separated by a median hiatus and three supralabials	<i>Mesobaena</i>
Rostral higher than long with a sharp vertical keel; four preloacal pores in a continuous series or two supralabials	<i>Anops</i>

TABLE 3

Diagnostic characters

	<i>Anops kingii</i>	<i>Anops bilabialatus</i>	<i>Mesobaena huebneri</i>
1. Rostral keel	strong	strong	moderate
2. Mental contacts 2nd infralabial	no	yes or no	yes
3. Precloacal pores	4, continuous	2, separated	2, separated
4. Tip of tail	elliptical	with doubled vertical ridge	with doubled vertical ridge
5. Supralabials	3	2	3
6. Postmental larger than a malar	no	yes	no
7. Body annuli	214-249	358-372	259-281

ETYMOLOGY. The new species is named *bilabialatus* with reference to the two supralabials, taking new latin *labiala* as equivalent to a labial scale.

ACKNOWLEDGMENTS

Grateful thanks are due to Professor Carl Gans of the University of Michigan Museum of Zoology for his authoritative advice and criticism of the manuscript and for the loan of a specimen of *Mesobaena huebneri*, to Miss A. G. C. Grandison for her assistance and encouragement, to Dr E. N. Arnold for advice and assistance

in taking X-rays and to Dr Garth Underwood for assistance in sexing the specimens and examining the eye. I would also like to thank Mr Iain R. Bishop and the other members of the Xavantina-Cachimbo Expedition who, through the courtesy of the Brazilian government, provided the type series of *Anops bilabialatus*.

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PLATE 1

Dorsal, lateral and ventral views of head of *Anops bilabialatus* holotype. Scale in 1 mm divisions.

